

B. Tech 8th Semester Examination
Material Handling and Plant Layout (NS)

ME-421(a)

Time : 3 Hours

Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt Five questions in all, selecting one question from each sections A, B, C and D. Section E is compulsory. Assume missing data suitably, if any.

SECTION - A

1. (a) Discuss the concepts and factors governing plant location economics.
- (b) Discuss use of cubic space principle of material handling, Citing application in a Soft-drink manufacturing industry.
- (c) Discuss importance of a good layout for success of material handling system. Take an example of a newspaper printing press (8+6+6=20)
2. (a) Provide a case study for selection of site for software company. How it differs from an automobile company?
- (b) Discuss information to be collected to prepare a layout. Take an example of a casting industry. Discuss various charts used in preparing a plant layout.
- (c) Discuss application of quantitative techniques in deciding most suitable plant layout. Discuss use of any one technique. Also, name the softwares used. (8+6+6=20)

SECTION - B

3. (a) Define material handling. Discuss major guidelines for cost reduction in Materials handling.
- (b) What are the common problems in plant layout? How they are solved?
Explain (i) operation process chart (ii) flow process chart (iii) string diagram. (10+10=20)
4. (a) Define (i) Line balancing (ii) Balance delay (iii) Smoothness index. What are various methods (heuristics) of solving line balancing problems? Explain Wester and Kilbridge method in detail
- (b) The desired daily output for an assembly line is 360 units. This assembly line will operate 450 minutes per day. The following table contains information on this product's task times and precedence relationships:
 - (i) Draw the precedence diagram.
 - (ii) What is the workstation cycle time?
 - (iii) Balance this line using the largest number of following tasks. Use the longest task time as a secondary criterion.
 - (iv) What is the efficiency of your line balance?

Task	Task time (seconds)	Immediate Predecessor
A	30	-
B	35	A
C	30	A
D	35	B
E	15	C
F	65	C
G	40	E,F
H	25	D,G

(10+10=20)

[P.T.O.]

SECTION - C

5. (a) Group technology (GT) layouts are now widely used in metal fabricating, computer chip manufacture, and assembly work. What steps you will take to shifting from process layout to a GT cellular layout? What are the advantages and disadvantages of GT based layouts?
- (b) Explain with neat sketches (i) Fixed path material handling equipments, and (b) Variable path material handling equipments. (10+10=20)
6. (a) Discuss the dynamic nature of the layout of an industrial plant. Explain the circumstances when revising and improving the layout become necessary.
- (b) Discuss basic features of handling and considerations including combined handling.
- (c) Amount of equipments required and predicting in process inventory by Graphical technique. (8+6+6=20)

SECTION - D

7. (a) Explain the maintenance system for following material handling equipments (i) Hoists and cranes (ii) Conveyors.
- (b) Explain load path matrix method which aims to reduce transportation of m-process inventory from one section to another section. (10+10=20)
8. Write short notes on
- (i) Factors affecting the selection of materials handling equipment in a production shop.
- (ii) Procedure for travel charting.
- (iii) Safety Aspects related to material handling. (8+6+6=20)

SECTION - E

9. (i) Name different types of conveyors.
- (ii) Explain importance of work station design in designing a work place layout.
- (iii) What do you mean by "Equipment Utilisation Ratio"?
- (iv) Define the principle of unit load for material handling
- (v) Differentiate plant location decision and Layout decision
- (vi) Define disadvantages of fixed position layout
- (vii) What do you mean by flow pattern?
- (viii) Which material handling principles forms the basis of design of different flow patterns?
- (ix) Differentiate between fabrication line balancing and assembly line balancing.
- (x) Discuss gravity principle of material handling, and the equipment suitable for handling such materials/goods. (10×2=20)